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STATINTL

TECHNICAL DESCRIPTION

AND

DESIGN OBJECTIVE FOR

STATINTL [redacted]

HIGH POWER STEREO COMPARATOR HEAD

This instrument is to be used as the optical viewing subsystem of a photographic measuring instrument. It is a major redesign of the High Power Stereoviewers manufactured on previous contracts with the U. S. Government. The primary change is in the optical system, to enable the reticles to be placed in an intermediate image plane, rather than in the eyepieces where they can be displaced when adjusting the Interpupillary Distance (IPD). Mechanical changes are required to accommodate the optical changes. In addition, the eyepiece angle will be adjustable.

The instrument consists of two [redacted] DynaZoom Lab-STATINTL oratory Microscopes coupled with an optical system to form a stereoviewer. The DynaZoom pod has a continuously variable magnification from 1X to 2X. With 5X and 10X eyepieces and 2.6X, 3.5X, 6X and 10X objectives, a magnification range from 13X to 200X is covered. The 3.5X and 6X objectives are not both needed to cover the magnification range, but the 3.5X objective gives a wider field and the 6X objective gives higher resolution.

Each optical system consists of an objective, the zoom elements, a penta prism to direct the path horizontally, an image rotation prism (Pechan), reticle, a field lens, a mirror to incline the path toward the eyepieces, a 1X relay lens, a field lens and finally the eyepiece.

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Following are the objectives used with this instrument:

Catalog #	Magnification	Focal Length	Numerical Aperture
31-10-07	2.6X	40mm	0.08
31-10-06	3.5X	30mm	0.09
31-10-18	6 X	22.7mm	0.17
31-10-17	10 X	16mm	0.25

The objective lenses are mounted in a four-position centerable nosepiece. The 3.5X, 6X and 10X objectives are parfocal and require very little refocusing when changing objectives.

The zoom is adjusted by means of a knob on the top of each pod. It is graduated from 1X to 2X in tenths.

The housing above the zoom system has been redesigned and, due to the complexity of the penta prism mount, the ability to provide monocular viewing or photomicrography has been omitted.

The Pechan prism rotates the image continuously without limit. 180° rotation of the prism rotates the image 360°. The prism mount has a knurled knob for turning and numbers to indicate approximately the amount of image rotation.

The reticle is mounted in a two-position slide, so that the reticle may be moved out of the field of view. The reticle will consist of an engraved and filled black dot, 0.016± .004mm, in the center of the field.

The IPD of the eyepieces is adjustable by means of a lever through a range of 55 to 72mm. The eyepieces are nominally 30° to the horizontal and are adjustable ± 7-1/2° for operator convenience.

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Adjustment of the eyepiece angle causes image rotation. A graduated scale reads the eyepiece angle. This angle must be transferred to a slip ring to set the "Zero" index for the Pechan prism which automatically compensates for the image rotation due to changing the eyepiece angle.

The centers of the objectives will be nominally 12.102 inches apart. Dimensions for mounting to the comparator are shown on the enclosed outline drawing, (D588337-003).

During the course of a measurement sequence, the Zoom knob and the image rotation prism must not be rotated. The nosepiece must not be rotated nor the centering adjustment moved.

Following are the eyepieces to be used:

Catalog #	Magnification
31-05-03	5X
31-05-60	10X W.F.

Resolution, field of view, etc., depend on the combination of eyepiece and objectives used and the position of the zoom system. The following table gives the nominal field size for combinations of the above listed eyepieces and objectives when the zoom is at 1X. When the zoom is at a position other than 1X, the total magnification is multiplied by the zoom magnification, and the field is divided by the zoom magnification.

Eyepiece	Objective	Magnification	Field
5	2.6	13	7.0mm
5	3.5	17.5	5.2mm
10	2.8	26	7.0mm
5	6	30	3.0mm
10	3.5	35	5.2mm
5	10	50	1.8mm
10	6	60	3.1mm
10	10	100	1.8mm

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Resolution cannot be conveniently expressed as so many lines per millimeter per power, because of the interchange of objectives and eyepieces.

Each eyepiece, zoom system and objective will be inspected in test fixtures and will meet the rigid [redacted] Quality STATINTL Assurance standards for a DynaZoom Laboratory Microscope. These tests include resolution,coma, astigmatism, etc.

With the 10X eyepieces, the zoom at 2X and the 10X objective, the instrument will have an axial resolution of approximately 700 lines per mm.

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Modify Skins - stiffening bar for front cover - to the removable present piece of skin not to be removed. To supply cover for protecting platen

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[redacted] to remove
- Glass platen & bolt for Y bellows

Can't do anything about focus mechanism

Digitizer Chassis - cross program to analysis - automatic level ~~[illegible]~~ schmidt trigger level circuit

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